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965,236

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Date of Application and filing Complete Specification: Nov. 22, 1960.
No. 40174/60.
Application made in Germany (No. B55638 Va/30h) on Nov. 23, 1957.
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Index at acceptance:—A5 B(1E, 1H, 2P, 2S)

International Classification:—A 61 k

COMPLETE SPECIFICATION

Compositions for Application to the Feet comprising Silicone Polymers

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hexachlorodiphenyl methane.

The exudation of sweat, or perspiration, of the skin, is affected among other factors, by temperature. Blocking of the sweat pores by means of impermeable layers, such as layers of ointments of high fat content, results in

ERRATUM

SPECIFICATION No. 965,236

Page 1, Heading German Application date,
for "Nov. 23, 1957" read "Nov. 23,
1959"

THE PATENT OFFICE
20th August 1964

ERRATA

SPECIFICATION No. 965,236

Page 1, line 19, delete "of" second occur-
rence

Page 1, line 29, for "chronic" read "chromic"
Page 4, line 32, for "cloro" read "chloro"

THE PATENT OFFICE
26th October 1964

It is the object of the present invention that the exuded sweat cannot effect the regions covered with the polysiloxane film. Perspiration can easily escape to the outside but, on the other hand, cannot enter from the outside to the inside. Accordingly, the compositions characteristic of the present invention prevent the skin remaining in contact with a saturated sweat medium.

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COMPLETE SPECIFICATION

Compositions for Application to the Feet comprising Silicone Polymers

We, P. BEIERSDORF & Co. A.G., a German Company, of Unnastrasse 48, Hamburg 20, Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

THIS INVENTION relates to compositions for application to the feet.

Because the human foot is usually encased in hose and shoes it is largely cut off from free access of air and, in consequence, since the perspiration or sweat secretions cannot readily evaporate, the foot commonly exists in a more or less sweat saturated medium. Decomposition of the sweat by bacterial action not infrequently readily gives rise to maceration which in turn may lead to interdigital mycosis. Furthermore, decomposition of the sweat of the foot commonly gives rise to an offensive odour.

Attempts have hitherto been made to reduce excessive secretion of sweat, or to prevent decomposition of the sweat, in order to inhibit the formation of the obnoxious odour. It is known to reduce excessive sweat secretion, or hyperhidrosis, by treatment with tanning agents such as formaldehyde, alum, hexamethylene tetramine or chronic acid compounds, astringents such as aluminium salts, or absorbents such as powders containing fats or fatty materials. To combat decomposition of sweat in order to prevent the offensive odour, treating substances have been proposed which influence the bacterial flora of the skin and give rise to a disinfectant and deodorising effect; these include halogenated phenols, chlorinated salicylic acid anilides, etc., e.g. 2-benzyl-4-chlorophenol or 2,2'-dihydroxy-3,5,6,3',5',6'-hexachlorodiphenyl methane.

The exudation of sweat, or perspiration, of the skin, is affected among other factors, by temperature. Blocking of the sweat pores by means of impermeable layers, such as layers of ointments of high fat content, results in

inflamed skin which may impede the normal secretion of sweat.

It is an object of the present invention to provide compositions for application to the feet, which both protects the foot against the deleterious action of the decomposition products of sweat and at the same time reduces the disagreeable odour.

It has been found that the exudation of sweat depends largely on the formulation of the applied composition and varies, for a given thickness of applied layer, with the materials of which the composition is composed. It has been found in particular that a film-like coating on the skin of certain silicone oil preparations does not retard secretion of sweat, but that the sweat exudes through the silicone oil film out of the skin and thus leaves the skin free to breathe.

According to the present invention a composition for application to the feet, comprises from 0.2 to 20% by weight, preferably from 0.5 to 5.0% by weight of liquid, ethyl-alcohol-soluble alkylaryl polysiloxane, especially alkyl-phenyl polysiloxane, an antibacterial substance serving to inhibit the decomposition of sweat and, as a third constituent, a major proportion of a volatile liquid which is non-irritant to the feet.

Polysiloxanes of the type referred to which have a viscosity of 10 to 30 centistokes at 20°C, especially methyl phenyl polysiloxane and ethyl phenyl polysiloxane, are particularly suitable.

When applied to the feet, the compositions of the invention do not prevent exudation of sweat through the thin film of polysiloxane, and the effect is that the exuded sweat cannot effect the regions covered with the polysiloxane film. Perspiration can easily escape to the outside but, on the other hand, cannot enter from the outside to the inside. Accordingly, the compositions characteristic of the present invention prevent the skin remaining in contact with a saturated sweat medium.

5 The decomposition-inhibiting agents incorporated in the compositions are anti-bacterial substances such as 2,2'-dihydroxy-3,5,6,3',5', 6'-hexachlorodiphenylmethane, bis-(5-chloro-2-hydroxyphenyl)-methane or tetramethylthiuramdisulphide, the said agents both inhibiting the decomposition of the sweat and killing the bacteria responsible for the decomposition of the sweat, so that the disagreeable odour arising from the decomposition of the sweat no longer develops. The odour-inhibiting effect of the compositions of the invention is further enhanced for the reason that the silicone oils do not promote or support the growth of fungi or bacteria.

10 The use of preparations for application to the skin is known. In addition, the use of silicones for the formulation of cosmetic preparations, such as hair colourants, hair brillian-
20 tines, barrier skin creams, dental creams, mouth washes, skin powders, ointment and lipstick bases, is also known.

25 Although it is known that silicones are used in the field of cosmetics in general, it has not hitherto been known that the compositions of the present invention, incorporating a comparatively small amount of certain liquid, alcohol-soluble polysiloxanes, impart a particular effect which both enables the skin to breathe and also prevents the deleterious effect of sweat and its decomposition products on the skin of the foot.

30 The compositions according to the invention may contain, in addition to the liquid, ethyl-alcohol-soluble polysiloxanes of low viscosity and the anti-bacterial inhibiting substances, a major proportion of easily vaporisable ingredients which have no irritant effect on the skin, e.g. water or low molecular weight alcohols.

40 The compositions should not include materials having a substantial or major covering effect such as fats, mineral oils or fat oils in quantities such that such materials would inhibit or reduce the breathing effect.

45 It has been shown, by measuring the moisture permeability of thin film-like coatings on living skin, that the covering effect of petroleum jelly amounts to about 58% and of wool fat alcohols about 40% whereas the use of a composition according to the invention incorporating liquid, alcohol-soluble polysiloxanes of low viscosity having a concentration of from 0.2 to 20% by weight shows practically no covering effect.

55 The compositions according to the invention can be prepared in various forms, e.g. as a solution for spraying, as cream or as liquid emulsion.

60 Films of fat-free preparations containing no silicone oils, when applied to the skin, generally lack sufficient elasticity and adhesion so that they rupture easily; the compositions according to the invention, on application to the skin, produce a more cohesive, thin, almost monomolecular film on the surface of the skin which in no way affects the contact-sensitivity of the skin and is largely resistant to water aqueous secretions, soaps, inorganic acids, salts, etc. Moreover, due to the thinness of the polysiloxane films, optimum conditions to enable the skin to breathe, i.e. the conditions permitting exudation of sweat to the outside of the layer, are achieved.

65 The following Examples will serve to illustrate the invention:—
70

EXAMPLE I

75 An aerosol spray was prepared of the following composition:

	%
Bis-(5-chloro-2-hydroxyphenyl)1-methane	0.2
2,2'-Dihydroxy-3,5,6,3',5',6'-hexachlorodiphenyl methane	0.2
Methylphenylpolysiloxane oil (25 c.st./20°C)	0.5
Liquid fatty alcohol or oleyl oleate or isopropyl myristate	0.5
Isopropanol or ethanol	98.6
	<hr/> 100.0 <hr/>

80 The solution was applied to the foot as a spray to give a moisture-thin coating. The effect was remarkable. Persons suffering from

excessive malodorous foot sweat were relieved of this after a single application.

EXAMPLE II

A cream was prepared of the following composition:

	%
Fatty alcohol polyglycoether	2.0
Glyceryl monostearate	5.0
Cetyl alcohol	10.0
Methylphenylpolysiloxane oil (viscosity 30 centistokes at 20°C)	3.0
Isopropyl myristate or palmitate	1.0
Fatty alcohol sulphate	2.5
Glycerine	23.4
Water	53.0
Tetramethylthiuramdisulphide or bis-(5-chloro-2-hydroxy-phenyl) methane or 2,2'-dihydroxy-3,5,6,3',5',6'-hexachlorodiphenylmethane	0.1
	<hr/> 100.0 <hr/>

5 The cream was applied in a thin film-like coating, especially between the toes. The odour-inhibiting effect was substantial after a very short time.

EXAMPLE III

A liquid emulsion was made up of the following composition:

10

	%
Triethanolamine stearate	2.1
Cetyl alcohol	0.5
Glycerine	1.0
Polyethylene glycol (mol. weight 4000 - 6000)	3.0
<i>p</i> -Hydroxybenzoic acid methyl ester (=methyl <i>p</i> -hydroxybenzoate)	0.2
Wool wax alcohol	0.5
Propyleneglycol mono myristate	2.0
Isopropyl myristate or palmitate	2.0
Methylphenyl polysiloxane oil (viscosity 20 centistokes at 20°C)	3.0
Tetramethylthiuramdisulphide or bis-(5-chloro-2-hydroxy-phenyl)-methane or 2,2',-dihydroxy-3,5,6,3',5',6'-hexachlorodiphenylmethane	0.1
Bentonite or magnesium-aluminium silicate	0.6
Water	85.0
	<hr/> 100.0 <hr/>

The emulsion was lightly massaged on the whole foot, and especially between the toes. The odour-inhibiting effect and removal of skin macerations was achieved within a very short time.

- 5 The film formed on the upper surface of the skin of the foot retains its effect over a long period of time, so that one or two applications per week are sufficient to eliminate undesirable odour and prevent blemishes so that the normal function of the skin of the foot is again exercised. The film formed is surprisingly resistant against attrition.

WHAT WE CLAIM IS:—

- 15 1. A composition for application to the feet, which comprises from 0.2 to 20% by weight of liquid, ethyl-alcohol-soluble alkylaryl-polysiloxane, an anti-bacterial substance serving to inhibit the decomposition of sweat and, as a third constituent, a major proportion of a volatile liquid which is non-irritant to the feet.
- 20 2. A composition according to claim 1 wherein the polysiloxane is present in a proportion of 0.5 to 5.0% by weight.

3. A composition according to claim 1 or 2 wherein the polysiloxane is a liquid, alcohol-soluble, methyl phenyl polysiloxane with a viscosity of 10 to 30 centistokes at 20°C.

4. A composition according to any of claims 1-3 wherein the inhibitor substance is 2,2'-dihydroxy - 3,5,6,3',5',6' - hexachlorodiphenyl methane, bis (5 - cloro - 2 - hydroxyphenyl) - methane or tetramethyl thiuramdisulphide.

5. A composition according to any of the preceding claims wherein the carrier medium is water and/or low molecular weight alcohol.

6. A composition according to any of the preceding claims in the form of an aerosol, cream or emulsion.

7. A composition according to claim 1 substantially as hereinbefore described with reference to any of the foregoing specific Examples I, II and III.

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